PROCESS FOR DETERMINATION OF OPTIMIZED EXPOSURE CONDITIONS FOR TRANSVERSE DISTORTION MAPPING

ABSTRACT

A process for providing illumination source conditions for the accurate determination Zernike tilt coefficients in the presence of coma is described. Large feature-shift coma sensitivity is simulated for a range of illumination conditions. The resulting source sensitivity data is modeled and a practical array of source shapes, each of which is optimized to eliminate the effects of transverse distortion due to third-order coma, is identified. The optimized set of source shapes can be used to more accurately determine Zernike terms a2 and a3 using a variety of methods. Knowledge of the lens distortion data in the absence of coma induced shifts can be entered into more traditional overlay regression routines to better identify systematic and random error. Additional applications of the above outlined procedure include: improved lithographic simulation using conventional optical modeling software and advanced process control in the form of feedback loops that automatically adjust the projection lens for optimum system performance.